Curriculum Vitae – Shubhankar Majumdar

Contact Information

Department of Electronics & Communication,
National Institute of Technology Meghalaya (NITM),
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Date of Birth 1st November 1987

Nationality Indian

Present Designation Assistant Professor at National Institute of Technology, Meghalaya (NITM)

Career Objective I want to become an efficient professional who can contribute to the organization in terms of optimum utilization of technology (conceptual, analytical, adaptable skills).

Research Interest

1. Development of Machine learning models for prediction of air pollution, landslide, soil parameters etc.
2. Development of Physics inspired Artificial Intelligence framework for circuit automation.
3. Development of low-cost and Energy efficient IoT system for non-destructive testing, Disaster Management and Agriculture purpose.

Research / Voluntary highlights

— Published more than **seventy papers** so far in peer-reviewed international journals and conferences. More than 620 citations(h index =12 and i10 index = 13).
— Received 2.5 million INR from DST for the Agriculture Startup, namely Soil Agritech Private Limited. Granted one Australian Patent (Application No. 2021102647) regarding Cloud assisted monitoring system for Hydroponics, and Granted one Indian Patent (Grant No. 443413) regarding Low-cost Soil Tensiometer design.
— Received 11 sponsored projects worth 5 crores INR.
— Opened IEEE CASS, MTTS, CEDA, WiE, Sensor Student Chapter at NIT Meghalaya. Reviewed more than hundred SCI Journal papers. TPC and reviewer for several IEEE conferences like ISCAS, VLSID, etc. Organized IEEE Society workshop funded by IEEE MTTS.

Education Qualification

Doctor of Philosophy (PhD) (Thesis Awarded : 24th November 2016)
(Specialization : Micro-Electronics)
from Advanced Technology Development Centre,
of Indian Institute of Technology Kharagpur, Kharagpur, WB, India.
Thesis Topic : TCAD based simulation, growth and characterization of Nitride-Based HEMT on Silicon for RF Switch Application.
Advisor : Prof. Dhrubes Biswas

Masters of Technology (M.Tech) with CGPA : 8.60/10 (Distinction), June 2012.
(Specialization : Microelectronics & VLSI Design)
from Department of Electronics and Instrumentation,
of Shri Govindram Seksaria Institute of Technology and Science (SGSITS), Indore, MP, India.
Thesis Topic : Design of Hardwired 8×8 SRAM BIST (Built In Self Test For Static Random Access Memory) in 180nm.
Advisor : Dr. Prashant. P. Bansod

Bachelor in Engineering (B.E.) with percentage : 75.78% (Distinction), June 2010.
(Specialization : Electronics & Communication)
from Department of Electronics and Communication,
of University Institute of Technology, Bhopal, India.
Thesis Topic : AM Receiver with 1 Mhz Center Frequency for Voice Recovery
Advisor : Ms. Prasansa Francis

Experience

1. **Mentoring Experience :** The proposal has been accepted and the team has become top 10 team of **India Innovation Challenge Design Contest 2016, sponsored by DST & Texas Instruments Inc.**
   The project title is **Automatic Regulated Water Supply through Energy Harvesting System**
2. **Teaching Experience :**
   (a) Working as **Assistant Professor (Level 12)** in Department of Electronics & Communication Engineering of National Institute of Technology, Meghalaya. from 19^{th} ***December 2023 - present***.

   (b) Working as **Assistant Professor (Level 11)** in Department of Electronics & Communication Engineering of National Institute of Technology, Meghalaya. from 25^{th} ***September 2019 -*** 18^{th} ***December 2023***.

   (c) Working as **Assistant Professor (Level 10)** in Department of Electronics & Communication Engineering of National Institute of Technology, Meghalaya. from 13^{th} ***December 2017 -*** 24^{th} ***September 2019***.

   (d) Working as **Faculty** in Department of Electronics & Communication Engineering of Indian Institute of Information Technology, Kurnool. from 18^{th} ***July 2017 -*** 12^{th} ***December 2017***.

   (e) Working as **Guest Faculty** in Special Manpower Development Project (SMDP) - Chip to System Design (C2SD) project of Department of Electronics and Information Technology (DietY), Government of India (GOI) at **NIT Raipur** from 9^{th} ***March 2016 -*** 27^{th} ***June 2017***.
   The project based on the ***"FPGA board level design of networking module having functionality of Media Access Control (MAC), routing and security as per IEEE 802.15.4 (Zigbee) standards"***

   (f) Conducted the class on Device Modeling at **IIT Kharagpur in VLSI Summer Course** from 15^{th} *May 2014 to* 17^{th} *June 2014*
3. **Research Experience :** Worked as Senior Research Fellow (SRF) in a project ***"Development of MBE cluster tool based epitaxial nano-semiconductor infrastructure and process integration facility for high performance RF/Microwave compound semiconductor heterostructure nano-devices on silicon"*** at **IIT Kharagpur** from 7^{th} *December 2015 -* 4^{th} *March 2016*

Skills

Scientific softwares : Keysight's Advanced Design Systems (Momentum, Harmonic Balance Simulation), Cadence (Spectre, Virtuoso & Assura), Matlab, HSpice, Tanner (S-edit, W-edit, L-edit & TSpice), Silvaco (Atlas & Athena), Python

Circuit Level Interfacing : VerilogA modelling.

Device's Parameter Extraction : Neural networks and Support vector machine.

Epitaxial Growth Tool : Molecular Beam Epitaxy

Fabrication Process Tools : Maskless Lithography via Focused Ion Beam Lithography, Optical Lithography through Mask Aligner (OAI200) & Spin-coater.

Characterization tools : Nanometrics's PL & HALL instrument, Bede's HR-XRD, Merlin SEM, RF probe stations (Cascade), DC probe station(Everbeing), Keithley's 4200SCS, Spectrum analyzer, Signal Generator, Mixed Signal Oscilloscope, Vector Network Analyzer .

Paper & Report Writing Tool : Microsoft Office, Visio, LaTeX, Origin, Draw.io.

Professional Organizations

IEEE Senior member (ID No. 92775344) *2015- present*
Union Radio-Scientifique Internationale Member (ID No. M1838573204) *Lifetime Member*
Electrochemical Society Member (ID No. 406059) *Lifetime Member*
The Institute of Engineers (India) (ID No. AM1849193) Associate Member *Lifetime Member*
International Association of Engineers (IAENG) (ID No. 208814) *Lifetime Member*

Awards and Honors

- Awarded best researcher in the National Institute of Technology Meghalaya on 1st April 2024.
- 2nd Runner Up in the 2023 IEEE DataPort Climate Change Dataset Upload Contest
- Enlisted in Golden List of Reviewers for 2020, 2021, 2022 of IEEE Transaction of Electron Devices
- Received Marie Sklodowska-Curie Actions Seal of Excellence award from European Commission in 2018.
- Semifinalist for the Cisco Global Problem Solver Challenge in 2018.
- Received National Postdoctoral (NPDF) Fellowship in 2017.
- Received Italian Fellowship for Postdoctoral in 2017.
- **TI IICDC 2016** (Technical Video | Buisness Video)
  Mentor of the Incubated Company – Successfully become top 10 teams in Texas Instruments Inc. India Innovation Challenge Design Contest 2016 with over 11000 participants from 624 colleges of India. Got Incubation of **INR 2500000/-** from Department of Science and Technology (DST), Texas Instruments, and anchored by NSRCEL of IIM Banglore for this project.
- **International Travel Grant** from Ministry of Human Resource and Development (MHRD) India for EMRS Fall Meeting, 2015, Warsaw Poland
- Received **IIT KGP Institute Scholarship** in 2012 for pursuing PhD from MHRD, Government of India.
- Received **GATE Scholarship** in 2010 for pursuing M.Tech from MHRD, Government of India.

Technology Developed

- ***DEWS- Drought Early Warning System*** in 2018
  Brief Details : DEWS is technology for Drought Prediction and Mitigation for governmental disaster management bodies leading to immediate response and relief for 53 million people affected by droughts annually.
  Reference : Semi-Finalist in CISCO Global Problem Solver 2018
- ***Automatic Regulated Water Supply through Energy Harvesting System*** in 2016
  Brief Details : IoT based system for automatic water supply in drip irrigation
  Reference : Mentor of Incubated company SOIL Agritech Private Limited

Sponsored Projects (National Level)

— **As Principal Investigator**

1. Project Title : Air Quality network for SMART City : Real-time air quality monitor, evaluation, and prediction of air pollutants using Machine Learning through the deployment of low-cost air quality sensor (LAQS) in India and two selected ASEAN countries (Malaysia, Philippines). (**Completed**)
   International PI : Prof. Mohd Shahrul Mohd Nadzir (Malaysia) & Prof. Mylene Cayetano (Philippines)
   Sponsoring Agency : ASEAN-India STI Cooperation
   Sanction Number : CRD/2020/000320
   Budget : 26,25,696 INR (Indian Side)
   Duration : 2 Years
2. Project Title : Development of E-mode III-Nitride devices for Energy Optimized Agile Power Electronics. (**Completed**)
   International PI : Prof. Alice Hospodkov (Institute of Physics, Czech Academy of Sciences)
   Sponsoring Agency : Department of Science & Technology (International Bilateral Co-operation Division)
   Sanction Number : DST/INT/Czech/P-015/2019
   Budget : 54,52,162 INR (Indian Side) + $ 57,543 (Czech Side)
   Duration : 3 Years.
3. Project Title : Prediction, Detection and Monitoring System for Landslide in Hilly Region. (**Completed**)
   International PI : Prof. Masahiro Fujita (University of Tokyo)
   Sponsoring Agency : Department of Science & Technology (International Bilateral Co-operation Division)
   Sanction Number : DST/INT/JSPS/P-301/2019
   Budget : 6,26,000 INR (Indian Side) + $ 16000 (Japanese Side)
   Duration : 2 Years.
4. Project Title : Tensiometer based Automated IoT system for irrigation. (**Completed**)
   Sponsoring Agency : Department of Science and Technology under Device Development Programme.
   Sanction Number : DST/TDT/DDP-27/2018
   Budget : 16,84,941 INR.
   Duration : 2 Years.

— **As Co- Principal Investigator**

1. Project Title : UAV Assisted SOIL Moisture Content Determination through 5G Network **(Ongoing)**
   Sponsoring Agency : Department of Telecommunication Ministry of Communication
   Sanction Number : D.O.No. 1-IMC (100UCL)/2023-SR1
   Budget : 1,26,70,000 INR
   Duration : 5 Years.
2. Project Title : Development of On-chip MEMS Pressure Sensor based Tensiometer for Agriculture **(Ongoing)**
   Sponsoring Agency : R & D in Electronics Group, Ministry of Electronics & Information Technology
   Sanction Number : EE-9/2/2021-R&D-E
   Budget : 1,10,980,000 INR
   Duration : 5 Years.
3. Project Title : AI Empowered Advanced Wireless Communication Systems **(Ongoing)**
   Sponsoring Agency : DST sponsored FIST Level - 1
   Sanction Number : SR/FST/ET-I/2020/689
   Budget : 80,00,000 INR.
   Duration : 5 Years.
4. Project Title : Sensor based Big Data Analysis for Prognostics and health management of RCC bridges **(Ongoing)**
   Sponsoring Agency : Border Road Organization (BRO)
   Sanction Number -20416/Res/RCC Bridges/56/E2
   Budget : 34,02,800 INR.
   Duration : 3 Years.
5. Project Title : Fully acoustics testing of low velocity impact damage in composite plate using the concept of local defect resonance **(Ongoing)**
   Sponsoring Agency : Aeronautics R and D Board
   Sanction Number : ARDB/01/1052041/M/1
   Budget :2402800
   Duration : 3 Years.
6. Project Title : Cloud-assisted Data Analytics based Real-Time Monitoring and Detection of Water Leakage in Transmission Pipelines using Wireless Sensor Network for Hilly Regions.(**Completed**)
   Sponsoring Agency : Ministry of Earth Science under National Mission on Himalayan Studies (NHMS).
   Sanction Number : GBPNI/NHMS-2017-18/SG-21
   Budget : 44,70,880 INR.
   Duration : 3 Years.
7. Project Title : AI-Driven Soil Parameter Monitoring for Organic Farming in Meghalaya(**Ongoing**)
   Sponsoring Agency : DST - North East Center for Technology Application and Reach (NECTAR)
   Budget : 7,08,750 INR.
   Duration : 1 Year.
8. Project Title : 6G Standardization : Critical Data Transmission (Remote location data) during Natural Calamity for North-eastern Region in India for Vehicular Autonomy (**Ongoing**)
   Sponsoring Agency : Department of Telecommunication (DoT)
   Sanction Number : TTDF/6G/345
   Budget : 1,53,82,400 INR.
   Duration : 3 Years.

Sponsored Projects (State/ Institute Level)

— **As Principal Investigator**

- Project Title : Cloud-Assisted Hybrid Renewable Energy Sources for Electricity and Water Supply in Rural Area. (**Completed**) Budget : 99,960 INR
  Project Title : A Self-Sustained Multiple Sensor IoT Based Landslide Detector Early Warning System. (**Completed**) Budget : 49,335 INR
  Project Title : Smart Agro Modular System. (**Completed**) Budget : 46,465 INR
  Project Title : Smart Blind Stick. **(Completed)** Budget : 19,950 INR
  Project Title : A Portable Wind-Hydro Hybrid Electronic Charger Targeted for Outdoor Activities and Military Applications. (**Completed**) Budget : 49,742 INR
  Sponsoring Agency : State Council of Science, Technology & Environment Meghalaya
  Total Budget : 2,65,452

Sanction Number : CST 6/2019/103
Duration : 1.5 Years.

As Co-Principal Investigator

- Project title : Design and Fabrication of temperature and humidity-controlled drying chamber for drying of spices. Budget : 3,98,800 INR Duration : 1 year **Ongoing**

Publications (Patent)

1. **HYDROPOD : LOW-COST, SCALABLE, AND CLOUD-ASSISTED HYDROPONICS SYSTEM** by D. Adak, P. Singh, S. Majumdar, Australian Innovation Patent, (Application No. 2021102647) June 2021 **(Status : Granted)**
2. **Automatic Refilling Soil Tensiometer And Tip Rinsing Mechanism Through Fluid Whirls** by Shubhankar Majumdar, Shyam Akashe, Aaditya Chaudhary, Ashish Verma, Indian Patent, (Application No. 201931005912), **Patent No. - 443413**, 2019 **(Status : Granted)**
3. **An Implanted medical device** by A. Malakar, M. Roy, A. Ganguly, N. Chatterjee, S. Majumdar, B. Neogi, P. Saha **Application No. 202431050042 (Status : Filled)**

Contributor (Whitepaper)

1. Y. J. Zhao, L. L. Dai, J. H. Zhang, et al. " 6G Near-field Technologies White Paper," FuTURE Forum, Nanjing, China, Apr 2024. doi : 10.12142/FuTURE.202404002.

Publications (Article)

1. J. Borah, Md. Shahrul Md. Nadzir, M. Cayetano, S. Majumdar, H. Ghayvat, and G. Srivastava " Timezone-Aware Auto-Regressive Long Short-Term Memory Model for Multi-Pollutant Prediction" Transactions on Systems, Man and Cybernetics : Systems, **(IEEE)**, DOI : 10.1109/TSMC.2024.3463960 (Accepted) **Q1**
2. A. Paul, G. Bhargava, D. Adak, S. Dutta, S. Majumdar "Design and validation of a microstrip log-periodic feedline based filter for microwave imaging of rebar" IEEE Transactions on Instrumentation & Measurement , **(IEEE)**, vol. 73, pp. 1-8, 2024, Art no. 8005808 , doi - 10.1109/TIM.2024.3481566. **Q1**
3. Sharailin Gidon, Jintu Borah, Smrutirekha Sahoo, Shubhankar Majumdar, "Neural Network Approaches for Enhanced Landslide Prediction: A Comparative Study for Mawiongrim, Meghalaya, India ", Natural Hazards (Accepted 1/10/24) **Q1**
4. V. M. Tammineni, S. Beura, M.V.H B. MURTHY , P. Saha, S. Majumdar, "Optimized Recursive Approximate Multipliers for Edge Detection and Image Smoothing Application " Microsystem Technologies **Accepted**, 2024. **Q3**
5. A. Paul, G. Bhargava, S. Majumdar "Development and Characterization of Log Periodic Feedline Based Filter for Water Leakage Detection in Size Invariant PVC Pipes " Flow Measurement and Instrumentation, **(Elsevier)**, Volume 98, September 2024, 102647 **Q2**
6. A. Paul, G. Bhargava, P.K. Gautam, S. Majumdar " Non-Destructive Evaluation of Strength and Porosity of Bituminous Mixes Using Log Periodic feedlines-based Ring Filter ", IEEE Transactions on Instrumentation and Measurement, vol. 73, pp. 1-10, 2024, Art no. 8003110, doi : 10.1109/TIM. 2024.3381667 **Q1**
7. A. Paul, H. Kumari, R. Snaitang, P. K. Gautam, S. Majumdar, "Microwave Imaging and Non-Destructive Testing of Bituminous Mix Binder-Aggregate Behavior Utilizing Log-Periodic Feedline-Based Microstrip Filter" MDPI NDT, 2024 ***(Invited Paper)***
8. D. Pyngrope,N. Chaturvedi, S. Dasgupta, A. hospodko, S. Majumdar, " Comprehensive empirical modeling of ScAlN/AlGaN/GaN ferroelectric HEMT " Semiconductor Science and Technology, Semiconductor Science Technology, vol. 39, pp.no. 075015 **IoP Publisher**. **Q3**
9. G. Bhargava, V. Vadala, S. Majumdar, and G. Crupi "Physics-Informed Neural Network Assisted Automated Design of Power Amplifier by User Defined Specifications" Int J Numer Model. Volume37, Issue3, May/June 2024, e3246 **Q3**
10. J. Borah, Md. Shahrul Md. Nadzir, M. Cayetano, S. Majumdar, H. Ghayvat, and G. Srivastava " AiCareAir: Hybrid-Ensemble Internet of Things Sensing Unit Model for Air Pollutant Control, IEEE Sensor Journal vol. 24, no. 13, pp. 21558-21565, Jul 2024 **Q1**

11. G. Bhargava, S. Majumdar, F. Medjdoub "Importing experimental results via S2D model in ADS tool for Power Amplifier Design" IETE Journal of Research **(Taylor and Francis)**, vol. 70(8), pp. no. 6932â6939. **Q3**
12. M. Shahrul, et.al. "Utilizing a Low-Cost Air Quality Sensor: Assessing Air Pollutant Concentrations and Risks Using Low-Cost Sensors in Selangor, Malaysia" Water, Air, & Soil Pollution **(Springer)** 235, 229 (2024) **Q2**
13. D. Pyngrope, M. Biswas, Shiv, S. Majumdar, A. Bag "RF magnetron sputtering of Ga2 O3 thin films: Analysis of thermal annealing induced tuning of structural, optical characteristics, and energy band alignments." *Materials Science in Semiconductor Processing* **(Elsevier)**, Volume 174, May 2024, 108243. **Q1**
14. D. Pyngrope, S. Majumdar, G. Crupi "Fractional order capacitance behavior due to hysteresis effect of ferroelectric material on GaN HEMT devices", Int J Numer Model. 2024; 37(2) :e3206. doi :10.1002/jnm.3206. **Q3**
15. J. Borah, S. Kumar, N. Kumar, M.S.M.Nadzir, M. G. Cayetano, H. Ghayvat, S. Majumdar, and N. Kumar "AiCareBreath: IoT Enabled Location Invariant Novel Unified Model for Predicting Air Pollutants to Avoid Related Respiratory Disease" in IEEE Internet of Things Journal vol. 11, no. 8, pp. 14625-14633, April 2024. **Q1**
16. S. Gidon, J. Borah, S. Sahoo, S. Majumdar, M. Fujita " Bi-Directional LSTM Model for Accurate and Real-Time Landslide Detection: A Case Study in Mawiongrim, Meghalaya, India" IEEE Internet of Things Journal, vol. 11, no. 3, pp. 3792-3800, Feb 2024. **Q1**
17. M. Biswas, D. Pyngrope, Shiv, S. Majumdar, A. Bag " RF magnetron sputtering of Ga2 O3 thin films: Analysis of oxygen flow rate impact on stoichiometry, structural, optical characteristics, and energy band alignments" *Materials Science in Semiconductor Processing* **(Elsevier)**, Vol. 169, January 2024, pp.no. 107937 **Q1**
18. A. Paul, G. Bhargava, and S. Majumdar "Impact of holes in an interdigital parallel folded coupled line-based wideband bandpass filter for X-band applications." in *Microwave and Optical Technology Letters* **(Wiley)**, Volume 66, Issue 1, pp. no. e33903, 2024 **Q3**
19. G. Bhargava, S. Majumdar, G. Gugliandolo, G. Campobello, N. Donato and G. Crupi, "Design and Validation of a Low-Cost Antenna-Based Solution for Microwave Imaging of RCC Structure," in *IEEE Sensors Letters* **(IEEE)**, VOL. 7, NO. 4, APRIL 2023 **Q2**
20. U.Rabuan, et. al. "Evaluations of low cost Air Quality Sensors for Particulate Matters (PM 2.5) in Indoor and Outdoor conditions", in *Sensors and Materials* **Myu Scientific Publishing** Vol. 35, No. 8, 2023, p. 2881-2895. **Q3**
21. G. Bhargava, V. Vadala, S. Majumdar, and G. Crupi. "Auto–encoder based hybrid machine learning model for microwave scaled GaAs pHEMT devices," International Journal of RF and Microwave Computer Aided Engineering **(Wiley)**, Vol. 32(11), pp. no. - e23339, 2022 **Q3**
22. N. Kattekola , S. Majumdar, "A novel design of N-bit approximate comparator for image processing applications," Circuit World (**Emerald Publishers**), Vol. 50, no. 2/3, pp. 257-266, 2024 **Q4**
23. C. Patel, et.al "DBGC: Dimension Based Generic Convolution Block for Object Recognition"Sensors (MDPI Publisher), vol 22(5), 1780 **Q1**
24. N. Kattekola , A. Jawale , P. K. Nath , S. Majumdar, "Efficient partial product reduction for image processing application using approximate 4:2 compressor," Circuit World (**Emerald Publishers**), Vol. 50 no. 2/3, pp.no. 240-246 ,2024 **Q4**
25. Mohd Nadzir, et.al "Risk Assessment and Air Quality Study during Different Phases of COVID-19 Lockdown in an Urban Area of Klang Valley, Malaysia" Sustainability 13 (**MDPI Publisher**), no. 21 : 12217. **Q1**
26. H. Ghayvat, M. Awais, P. Gope, S. Pandya, S. Majumdar, "ReCognizing SUspect and PredictiNg ThE SpRead of Contagion Based on Mobile Phone LoCation DaTa (COUNTERACT): A System of identifying COVID-19 infectious and hazardous sites, detecting disease outbreaks based on the internet of things, edge computing, and artificial intelligence" *Sustainable Cities and Society* ***(Elsevier)***, vol. 69, pp 102798, June 2021 **Q1**
27. S. Das, S. Dutta, D. Adak, S. Majumdar"On the crack characterization of reinforced concrete structures: Experimental and data-driven numerical study" ***Structures (Elsevier)***, vol. 30, pp 134- 145, 2021. **Q1**

28. D. S. Saini, A. Ghosh, S. Tripathy, A. Kumar, S. K. Sharma, N. Kumar, S. Majumdar, D. Bhattacharya, "A Promising Proton Conducting Electrolyte $BaZr_{1-x}Ho_xO_{3-\delta}$ $(0.05 \leq x \leq 0.20)$ Ceramics for Intermediate Temperature Solid Oxide Fuel Cells " ***Scientific Reports (Nature Publishing Group)***, vol. 10, no. 1, pp 1-12, 2020. **Q1**
29. S. Das, S. Dutta, C. Putcha, S. Majumdar, D. Adak, "A data-driven physics informed method for prognosis of infrastructure systems: Theory and application to crack prediction," *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A : Civil Engineering (**American Society of Civil Engineers (ASCE)**)* vol. 6, no. 2, pp. 04020013, 2020 **Q1**
30. S. Moulik, and S. Majumdar, "FallSense: An automatic fall detection and alarm generation system in IoT-enabled environment, " *IEEE Sensor Journal (**IEEE**)*, Vol. 19, no. 19, Oct 2019. **Q1**
31. A. Bag, S. Majumdar, S. Das, and D. Biswas, "Probing InGaN immiscibility at algan/ingan heterointerface on silicon (111) through two-step capacitance-voltage and conductance-voltage profiles," *Materials & Design **(Elsevier)***, 2017. **Q1**
32. S. Majumdar and D. Biswas, "Evaluating substrate's effect on RF switch performance via Verilog-A GaN HEMT model," *Microelectronics Journal **(Elsevier)***, vol. 62, pp. 43–48, 2017. **Q3**
33. S. Majumdar, A. Bag and D. Biswas, "Comparative analysis of parameter extraction techniques for AlGaN/GaN HEMT on silicon/sapphire substrate, " *Microelectronics Reliability **(Elsevier)***, vol. 78, pp. 389–395, 2017. **Q3**
34. S. M. Dinara, S. Ghosh, S. K. Jana, S. Majumdar, D. Biswas, and S. Bhattacharya, "Analysis of strain induced carrier confinement with varying passivation thickness of the Al0. 3Ga0. 7N/GaN heterostructure with graded AlxGa1-xN buffer on Si (111) substrate," *Journal of Vacuum Science & Technology B, Nanotechnology and Microelectronics : Materials, Processing, Measurement, and Phenomena (**American Vacuum Society**)*, vol. 35, no. 5, p. 051202, 2017. **Q3**
35. S. Das, S. Majumdar, R. Kumar, S. Ghosh, and D. Biswas, "Thermodynamic analysis of acetone sensing in pd/algan/gan heterostructure schottky diodes at low temperatures," *Scripta Materialia **(Elsevier)***, vol. 113, pp. 39–42, 2016. **Q1**
36. A. K. Patra, S. Gautam, S. Majumdar, and P. Kumar, "Prediction of particulate matter concentration profile in an opencast copper mine in india using an artificial neural network model," *Air Quality, Atmosphere & Health **(Springer)***, vol. 9, no. 6, pp. 697–711, 2016. **Q2**
37. A. Bag, P. Das, R. Kumar, P. Mukhopadhyay, S. Majumdar, S. Kabi, and D. Biswas, "2deg modulation in double quantum well enhancement mode nitride HEMT," *Physica E : Low-dimensional Systems and Nanostructures **(Elsevier)***, vol. 74, pp. 59–64, 2015. **Q2**
38. S. Majumdar, A. Bag, and D. Biswas, "Implementation of VerilogA GaN HEMT model to design RF switch," *Microwave and Optical Technology Letters **(Wiley)***, vol. 57, no. 7, pp. 1765–1768, 2015. **Q3**
39. S. Majumdar and D. Biswas, "Performance variability projection of InGaN/AlGaN/GaN E-mode HEMT for RF switch application," *ECS Solid State Letters **(Electrochemical Society - IoP Publication)***, vol. 4, no. 10, pp. P72–P74, 2015. **Q4**

Publications (Book Chapters)

1. Gaurav Bhargava, and Shubhankar Majumdar, "Sustainable 6G communication: Design of power amplifier for wireless power transfer applications," In book, "Chapter 18 - 6G Communication Network: Architecture, Security, and Applications," published by CRC Press, Taylor & Francis Group, Feb 2024
2. Gaurav Bhargava, and Shubhankar Majumdar. "Pre-Distortion: An Effective Solution for Power Amplifier Linearization." In book RF Circuits for 5G Applications : Designing with mmWave Circuitry (2023) :**(Wiley Press)**, Chapter- 12, pp.no. - 223-239.
3. Applications of the Approximate Computing on ML Architecture In book "VLSI and Hardware Implementations using Modern Machine Learning Methods" by K. Naresh and S. Majumdar (2021)**(CRC Press)**, Chapter- 11, pp.no. - 197-234.
4. A Vision-Based Data-Analytics Tool for Crack Characterization in Reinforced Concrete Structures Advances in Structural Mechanics and Applications: Proceedings of ASMA-2021 by S. Das, S. Dutta, D. Adak, S. Majumdar (2022)**(Springer Press)**, Chapter-16, pp.no. - 210–218.

5. Region of Interest Based Encryption of Biomedical Image by S. Vodnala, S. Majumdar, P. Nath, In the book " Data Intelligence and Cognitive Informatics" **(Springer, Singapore Publication)**, Pages : 243-259 Year : 2021
6. Design of a 22 W (0.7 A) Current Controlled DC-DC Flyback Converter Operating in DCM Mode by Ananya Bhattacharya, Shubhankar Majumdar, In the book "Emerging Trends in Electrical, Communications, and Information Technologies" **(Springer, Singapore Publication)** Pages : 247-258 Year : 2020
7. **Reduction of Hardware Complexity of Digital Circuits by Threshold Logic Gates Using RTDs** by Muhammad Khalid, Shubhankar Majumdar, Mohammad Jawaid Siddiqui, In the book " Information and Communication Technology for Intelligent Systems" **(Springer, Singapore Publication)** Pages : 697-710 Year : 2019

Publications (Conference Proceedings)

1. V. Tammineni, S.Majumdar, P. Saha, S.K. Beura, M. V. H. B. Murthy, "Enhancing Image Processing Applications with Rounding in Recursive Approximate Multipliers " 13th International Conference on Computing, Communication and Sensor Network. CCSN2024 (Best Paper Award)
2. H.Kumari, A. Paul, J. Borah, S. Majumdar "Data-Driven BiLSTM Prediction Model for Dual-Band RF Power Amplifier," IEEE MAPCON 2024 (Accepted)
3. A. Paul, R. Snaitang, P.K.Gautam, S. Majumdar, "Assessment of Binder Aggregate Behavior of Bituminous Mixes Using Log-Periodic Feedlines Based Microstrip Filter", IEEE MAPCON 2024 (Accepted)
4. H. K. Dewangan, G. Bhargava, S. Majumdar " Advanced Design Strategies for Ultra-wideband Power Amplifiers Utilizing Multi-Branch Matching Networks " IEEE SPACE 2024, doi : 10.1109/SPACE63117.2024.10667793
5. H. K. Dewangan, G. Bhargava, J. Borah, S. Majumdar " Data-Driven Model-Based Design Approach for Class EFJ Power Amplifier With Analog Predistortion Circuit" IEEE MAPCON 2023 , doi : 10.1109/mapcon58678.2023.10463784
6. S. Warjri, A. Surong, S. Majumdar, M. M. Langstieh, M. Marbaniang and P. P. Singh, "Radar Communication via Asymmetric and Wideband Chaotic Signal," 2023 5th International Conference on Energy, Power and Environment : Towards Flexible Green Energy Technologies (ICEPE), Shillong, India, 2023, pp. 1-6, doi : 10.1109/ICEPE57949.2023.10201586.
7. Gaurav Bhargava, Pinak Kumar Rath, and Shubhankar Majumdar. "GaN-based Class-F Power Amplifier for 5G Applications." In 2022 IEEE Microwaves, Antennas, and Propagation Conference (MAPCON), pp. 1444-1449. IEEE, 2022 doi : 10.1109/MAPCON56011.2022.10047615.
8. K. Naresh, Y. P. Sai and S. Majumdar, "Design of 8-bit Dadda Multiplier using Gate Level Approximate 4 :2 Compressor," 2022 35th International Conference on VLSI Design and 2022 21st International Conference on Embedded Systems (VLSID), 2022, pp. 269-274, doi : 10.1109/VLSID2022.2022.00059.
9. G. Bhargava and S. Majumdar, "Assessment of Filter Design for 5G Applications," 2022 IEEE VLSI Device Circuit and System (VLSI DCS), 2022, pp. 85-88, doi :10.1109/VLSIDCS53788.2022. 9811462
10. G. Bhargav and S. Majumdar, "Design of Novel Rat-Race Coupler Based Analog Pre-Distortion Circuit for 5G Applications" presented in International Conference for Advancement in Technology (ICONAT) during 21st - 22nd January 2022. 10.1109/ICONAT53423.2022.9725857
11. K.Naresh, P. Sai, Rohith, S. Majumdar, Efficient Design of Artificial Neural Networks using Approximate Compressors and Multipliers presented in 7th IEEE Symposium on Smart Electronic Systems (iSES 2021), 18-19 December 2021 10.1109/iSES52644.2021.00044
12. G. Bhargav and S. Majumdar, "Highly Linearized GaN HEMT Based Class E/F3 Power Amplifier", IEEE Devices for Integrated Circuit (DevIC) 2021, 19-20 May 2021 10.1109/DevIC50843.2021.9455844
13. B. Roy, S. Majumdar and S. Das, "Temperature dependent gas sensor model for Schottky diode based on InAlN/GaN heterostructure," AIP Conference Proceedings 2352, 020051 (2021) ; 10.1063/5.0053310
14. K. Das, S. Majumdar, S. Moulik, M. Fujita, "Real-Time Threshold-based Landslide Prediction System for Hilly Region using Wireless Sensor Networks," IEEE International Conference on Consumer Electronics - Taiwan (ICCE-TW) 2020, 28 -30 Sept 2020 10.1109/ICCE-Taiwan49838.2020.9258181

15. S. Moulik, S. Majumdar, V. Pal, Yogita, "Water Leakage Detection in Hilly Region PVC Pipes using Wireless Sensors and Machine Learning," IEEE International Conference on Consumer Electronics - Taiwan (ICCE-TW) 2020, 28 -30 Sept 2020 10.1109/ICCE-Taiwan49838.2020.9258144
16. Design of Telescopic OTA based 6th order Butterworth Low Pass Filter using 0.18 ?m CMOS Technology by G. Bhargav, S. Majumdar, IEEE VLSI -DCS, 18- 19 July, Kolkata 10.1109/VLSIDCS47293.2020.9179746
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18. Development of Approximate Compressor Based Hybrid Dadda Multiplier for Image De-noising Applications by J.A. Arjun, S. Majumdar, 16^{th} IEEE India Council International Conference (INDICON), (2019) 10.1109/INDICON47234.2019.9030269
19. RF parameter extraction and S-parameter analysis of junctionless silicon nanowire transistor by Kavita, C. Sahu, S. Majumdar, IEEE IESC, pp. 7-12, (2019) doi: 10.1109/IESPC.20
20. Acetone Adsorption Characteristics of Pd/AlGaN/GaN Heterostructure Grown by PAMBE : A Kinetic Interpretation at Low Temperature by S. Das ; S. Majumdar ; S. Ghosh ; et al. IEEE SENSORS Conference, Pages : 1-4, 28-31 (2018) doi: 10.1109/ICSENS.2018.8589545
21. Non-Invasive Piezoelectric Sensor for Detection of Lung Cancer by D. Bhattacharya ; P. K. Rathore ; S. Majumdar, 3rd International Conference on Communication and Electronics Systems (ICCES), Pages : 418-421, 15-16 (2018) 10.1109/CESYS.2018.8723897
22. Fabrication of E-mode InGaN/AlGaN/GaN HEMT using FIB based Lithography by **S.Majumdar**, C. Sahu, D.Biswas Electron Devices Technology and Manufacturing Conference EDTM 2017 at Toyama, Japan (2017) doi :10.1109/EDTM.2017.7947579
23. Artificial neural network modelling of ADS designed Double Pole Double Throw switch by **S.Majumdar**, M.Zuhair, D.Biswas 18th International Symposium on VLSI Design and Test (2014) doi :10.1109/ISVDAT.2014.6881066
24. Barrier layer engineering : Performance evaluation of E-mode InGaN/AlGaN/GaN HEMT by **S. Majumdar**, S. Das, D. Biswas in 4th National Conference on Advanced Materials and Radiation Physics, Longowal, India, (2015) doi: 10.1063/1.4929179
25. Simplified gas sensor model based on AlGaN/GaN heterostructure Schottky diode by S. Das, **S. Majumdar**, R. Kumar, A. Chakraborty, A. Bag, D. Biswas in 4th National Conference on Advanced Materials and Radiation Physics, Longowal, India, (2015) doi: 10.1063/1.4929172
26. Cap layer Engineering : Performance Evaluation of E-Mode InGaN/AlGaN/GaN HEMT by **S. Majumdar**, P. Das, D. Biswas in 1st National Conference on Device and Circuits, NIST Behrampur, (2015) doi: 10.13140/2.1.3669.3280
27. Hardwired BIST Architecture of SRAM by **S. Majumdar**, P. Bansod 11th Indicon (2014) doi:10.1109/INDICON.2014.7030466
28. Comprehensive modeling of gas sensor based on Si3N4 passivated AlGaN/GaN Schottky diode by S.Das, **S.Majumdar**, R. Kumar, M. K. Mahata, S. M. Dinara, D. Biswas in ICEE, (2014) doi:10.1109/ICEmElec.2014.7151192
29. Designing of Control Logic Circuit for SRAM Memory Cell by **S. Majumdar**, D. Malviya, M. Mishra , P.P. Bansod International Conference on Information, Communication and Embedded System vol-1, pp. 375-381 (2012) doi : 10.13140/RG.2.1.3839.6008
30. Design of SRAM Cell In 0.18 mm Technology by M. Mishra, **S. Majumdar**, D. Malviya, P.P. Bansod International Conference on Information, Communication and Embedded System vol-1, pp. 457-463 (2012) doi:10.13140/2.1.2938.6883
31. Comparative Study on Implementation of Various Decoder Architecture. by D. Malviya, **S. Majumdar**, M. Mishra and P.P. Bansod International Conference on Information, Communication and Embedded System vol. 2, pp. 68-74 (2012) doi:10.13140/2.1.4511. 5524
32. Utilization of Support Vector Machine in determining the optimum operating temperature of ternary III-Arsenide alloys grown by MBE by **S. Majumdar**, R. Kumar, S.Das, M. Mahata, D. Biswas in European Material Research Society Fall Meeting, Warsaw, Poland, 2015.

33. Acetone sensing in AlGaN/GaN heterostructure on Si (111) : A Schottky diode sensor by S.Das, R.Kumar ,**S. Majumdar**, M.Mahata, S.Ghosh, D.Biswas in European Material Research Society Fall Meeting, Warsaw, Poland, 2015
34. Temperature dependent etching of Gallium Nitride layers grown by PA – MBE by **S. Majumdar**, S. Shaik, S. Das, R. Kumar, A. Bag, A. Chakraborty, M. Mahata S. Ghosh, D. Biswas in International Conference on Microwave and Photonics (ICMAP-2015) at ISM Dhanbad, (2015).doi:10.1109/ICMAP.2015.7408773
35. Determination of Polarity and Defect Density via Molten KOH Etching of MBE Grown AlN Layer by **S. Majumdar**, S. Sheikh, S. Ghosh, D. Biswas in International Workshop on the Physics of Semiconductor Devices (IWPSD) at IISc Bangalore, 66 (2015)
36. Trapping Characteristics Comparison between AlGaN/InGaN/GaN and AlGaN/GaN Heterostructure by Conductance Measurement by A.Chakraborty, P. Mukhopadhyay, S. Ghosh, S. Dinara, A. Bag, M. K Mahata, R. Kumar, S. Das, **S. Majumdar**, D. Biswas in International Workshop on the Physics of Semiconductor Devices (IWPSD) at IISc Bangalore, 22 (2015)
37. Electrical Degradation Mechanism of GaN High Electron Mobility Transistors on Silicon and Sapphire under OFF-state Stress by S. Ghosh, S. Das, P. Mukhopadhyay, A. Bag, **S. Majumdar**, Dhrubes Biswas MRS Fall Meeting 2015, Boston, Massachusetts RR (2015)
38. Role of Bulk Traps on Intermodulation Distortion of AlGaN/GaN HEMT. by A. Bag, P. Mukhopadhyay, **S. Majumdar**, D. Biswas MRS Fall Meeting 2015, Boston, Massachusetts RR (2015)
39. Trapping Effect Analysis of AlGaN/InGaN/GaN Heterostructure by Conductance-Frequency Measurement by A. Chakraborty, S.Ghosh, P. Mukhopadhyay, S. M. Dinara, A. Bag, M.K.Mahata, R. Kumar, S. Das, S. K .Jana, **S. Majumdar**, D.Biswas MRS Fall Meeting 2015, Boston, Massachusetts RR (2015)
40. Slotted CSMA/CA Simulation in Verilog by A. Chakradhari, S. Tamrakar, R. Basant, M. Vaidya, **S. Majumdar**, A. Naugarhiya, B. Acharya, S. Majumder and S. Verma at the International Workshop on Internet of Things and TV White Spaces (WIOT' 2017).
41. Remote Temperature & Humidity sensing through ASK Modulation Technique by J. Rusia, **S. Majumdar**, A. Naugarhiya, B. Acharya, S. Majumder, S. Verma in International Conference on ICTBIG 2016 at Indore doi:10.1109/ICTBIG.2016.7892642.
42. RF Based Wireless Data Transmission between Two FPGAs by J. Rusia, **S. Majumdar**, A. Naugarhiya, B. Acharya, S. Majumder, S. Verma at the International Conference on ICT in Business Industry Government (ICTBIG 2016) at Indore doi:10.1109/ICTBIG.20
43. Design and Simulation of Physical Layer Blocks of ZigBee Transmitter by A. Chaudhary, J. Rusia, K. Gourav, P. Tripathi, J. Pandey, **S. Majumdar**, A. Naugarhiya, B. Acharya, S. Majumder, S. Verma, at the International conference on IoT in Social, Mobile, Analytics and Cloud (I-SMAC), 2017 doi: 10.1109/I-SMAC.2017.8058369.
44. VERILOG based simulation of ASK, FSK, PSK, QPSK digital modulation techniques by A. Sharma, **S. Majumdar**, A. Naugarhiya, B. Acharya, S. Majumder, S. Verma, at the International conference on IoT in Social, Mobile, Analytics and Cloud (I-SMAC), 2017 doi: 10.1109/I-SMAC.2017.8058380

Student Supervision

1. **Ongoing PhD Students as Supervisor :**
   (a) **Gaurav Bhargava** - Automation of GaN-Based Power Amplifier for sub 6 GHz Application **Thesis Submitted**
   (b) **K. Naresh** - Towards Sophisticated Applications : Designing Approximate Computing Circuits for Neural Networks and Microwave Imaging **Thesis Submitted**
   (c) **Jintu Borah** - Prediction of Air Pollution through Low-cost air quality sensor dataset **Advanced Stage**
   (d) **Dariskhem Pyngrope** - Modelling and Fabrication of Ultra wide-bandgap semiconductor for RF application. **Advanced Stage**
   (e) **Hemant Kumari Dewangan** - Design and development of Highly linear Power Amplifier for 6G Application
   (f) **Mandira Biswas** - Development of device circuit co-design framework for RF application
   (g) **Amartya Paul** - Automation of Passive Components for material characterization
   (h) **Rajib Das** - Development of Instrumentation framework for Indoor Air Pollution Monitoring and Prediction.

(i) **Simanta Das** - Development of Instrumentation framework for Soil Quality Monitoring and Prediction.

(j) **Pritish Tripathi** - Determination of correlation between the enviornmental parameters

(k) **Dhiraj Kumar** - Modelling and fabrication of perovskite-based lead-free solar cells.

(l) **Parishmita Goswami** - Development of Sensor Acquisition application specific integrated circuit.

2. **Completed PG (M.Tech) Students Dissertation as Supervisor :**
   - **Amol Arjun Jawale - T17EC002** - APPROXIMATE 4 :2 COMPRESSOR BASED HYBRID DADDA MULTIPLIER FOR IMAGE PROCESSING APPLICATIONS
   - **Vodnala Srinivas - T18EC001** REGION OF INTEREST BASED ENCRYPTION OF BIOMEDICAL IMAGE
   - **Valle Hemanth - T19EC005**DESIGN AND ANALYSIS OF ANALOG PREDISTORTION CIRCUIT FOR POWER AMPLIFIER APPLICATIONS
   - **Pinak Kumar Rath - T20EC007** DESIGN, FABRICATION AND MEASUREMENT OF CLASS-F RF POWER AMPLIFIER
   - **Avinash Sahoo - T20EC003** CO-DESIGN OF ASYMMETRIC COUPLED BPF AND PA
3. **Completed UG (B.Tech) Students Dissertation as Supervisor :**

(a) **A.Sharma, A.Chakradhari, A. Chaudhary, J.Rusia** - Design and Simulation of Secured transmitter for WSN, 2016-2017. (Co-Guided in NIT Raipur)

(b) **Anand Kumar Paswan- (B15EC029)** - Designing of Metal Detector Using 555-Timer

(c) **Raman Kumar Gupta (B15EC032) & Shiva Teja Chigicherla (B15EC021)** - USE OF AUTONOMOUS ROBOT FOR CRACK DETECTION

(d) **Bollampalli Satya Abhinay (B16EC012) & Kamarapu Shivachandra (B16EC020)** - NONINVASIVE WATER FLOW AND LEAKAGE DETECTION IN PVC PIPES USING ACCELEROMETER

(e) **Sourav Paul (B17EC014)**DEVELOPMENT OF HUMAN MACHINE INTERACTION SYSTEM - AN INTERACTIVE AUGMENTED REALITY BOARD GAME USING HAND GESTURES IN OPENCV PLATFORM

(f) **MUMMIDI BHARADWAJ (B17EC015)** - NONINVASIVE WATER FLOW LEVEL AND LEAKAGE DETECTION

(g) **Ujjwal Kumar (B17EC019)** - COMPARATIVE STUDY OF MACHINE LEARNING AND DEEP-LEARNING TECHNIQUES ON REAL-TIME AIR POLLUTION DATASET

(h) **Bishal Doley (B18EC028)** - IMPLEMENTATION OF GENERATIVE ADVERSARIAL NETWORK ON AIR QUALITY DATASET

(i) **Utkarsh Kumar (B18EC033)** - IMPLEMENTATION OF HYBRID MODEL APPROACH FOR AIR QUALITY PREDICTION

(j) **Kerlarympei Mawrie (B18EC002), Matti Dondor Majaw (B18EC018), Alicelange Lyngkhoi (B18CE003) & Rudy L Suchiang (B18CE007)** - MEASUREMENT AND CALIBRATION OF EMBEDDED SENSORS FOR DETERMINATION OF CRACK AND DEFLECTION ON RCC BEAM

(k) **Shashank Kumar (B19EC010) & Nikhil Kumar (B19EC025)** - LOCATION INVARIANT MODEL FOR PREDICTING AIR POLLUTANTS

(l) **Shoaib Warjri (B19EC004), Atiarsing Surong (B19EC005), Michelvert Marbaniang (B19EE003) & Michael Mihsallan Langstieh (B19EE011)** - ASYMMETRIC AND WIDEBAND CHAOTIC RADAR COMMUNICATION

(m) **Altrey Sansara Swer (B19CE006) & Baiahunlang Lyngdoh (B19CE007)** - PREDICTION AND MONITORING OF RAINFALL INDUCED LANDSLIDES

Tutorials

1. Given a Tutorial on Microwave based non- destructive and non- invasive testing at IEEE MAPCON 2024, Hyderabad.

Speaker at Workshop / STTP

1. Given Expert talk at IEEE MTTS Student Branch Chapter MTT17 (SBC99082B), IIT Palakkad on " Development of GaN based RF Power Amplifier for Various Applications" dated 22 Jun 2024.
2. Expert talk at Faculty Development Program on 5G Technology Session on “5G Core Network and 5G Front-haul” Organized by : Department of Telecommunications, Ministry of Communications, Government of India. Topic of the talk - *GaN based RF Frontend design for 5G network* on 24 Apr 2024. Link
3. Invited talk at AICTE ATAL-sponsored One-Week Offline Faculty Development Programme (FDP) on “Advancement in VLSI Design and its Applications” from February 5-10, 2024

4. Invited talk at UKM Malaysia on Deployment of Air Pollution Sensor on 28th Nov 2022
5. Invited talk at IESM, University of Philippines on Internet of things (IoT) and Low-cost Sensors in environmental Research on 6th Mar 2023
6. Invited talk at Mariano Marcos State University, Ilocos Norte Philippines on Use of AI models for prediction of air pollution on 7th Mar 2023
7. Invited talk at National Engineering University, Batangas Philippines on Air Quality Monitoring Evaluation on 9th Mar 2023
8. Power Amplifier Design Issues, AICTE sponsored Short Term Training Program on "Emerging Issues of VLSI Design" during 22-26 Nov 21
9. AICTE sponsored 5 Days online ATAL FDP on EMERGING MATERIALS, SENSORS AND DEVICES FOR IoT AND INDUSTRY 4.0 given talk entilted Utilization energy harvesting circuits based on IoT systems for various applications on 27th August 2021 at CV Raman University
10. online Short term Training Program (STTP) on “Emerging Issues of VLSI Design” given talk entilted CMOS based various Amplifiers and their design issues on 17th July 2021 at ITM University Gwalior.
11. AICTE - ATAL sponsored FDP on Latest Technological Developments for System on Chip (SoC) Applications given talk entilted Advanced CMOS RF Power Amplifier Architecture Trends for 5G Wireless Networks on 29th July 2021 at GIET University, Gunupur.
12. Delivered one-week online Short-Term Training Program on “Emerging Nanoscale Devices, Circuits and Its Applications” Organized on May 10, 2021 at Delhi Technological University.
13. Deliver a lecture in the ATAL FDP (NEHU) during 8th-12th February, 2021 on "Sensors Implementation for Non-Invasive Pipe Water Leakage Detection and Monitoring of Soil Properties for Agriculture".
14. Given talk on IoT in the AICTE sponsored STTP on Recent Trends in Internet of Things (IoT) and Embedded System Based Monitoring and Control of Distributed Generation.
15. Deliver two Expert talk in E Workshop On “Design Challenges of IoT with AI & ML Applications” November 30th âDecember 04th 2020, NIT Hamirpur, Case Study of IoT Usage in Hilly region for Landslide Prediction and Water Leakage Prediction
16. A talk on **Layout Design and Challenges** in the EICT workshop on Emerging CMOS Technologies and Beyond, Trends and Challenges organized by MNIT Jaipur. Video Recording of the talk - Link
17. A talk on **Case Study of IoT Usage in Hilly region for Landslide Prediction and Water Leakage Prediction** in the workshop on Design Challenges of IoT with AI and ML Applications
18. A talk on **Case Study of IoT Usage in Agriculture** in the workshop on Design Challenges of IoT with AI and ML Applications
19. A talk on **Various type of CAD tools and Cadence tool live demonstration** in the workshop on Recent trends in VLSI Devices/Circuits and Applications organized by MNIT Jaipur
20. A talk on **Ultra-wide bandgap semiconductor opportunities in Power sector** in the AICTE sponsored STTP on “Design and Simulation of Semiconductor Devices” at ABES Engineering College, Ghaziabad.
21. A talk on **Approximate Computing** in the IEI Sponsored five day workshop on Cutting edge technology held from 29th April-3rd May, 2019 in the CoochBehar Government Engineering College.
22. A talk on ***IoT System & Opportunities in Indian Context*** at IEEE EDS student branch chapter Meghnad saha Institute of Technology, dated : *11 March, 2019*
23. A talk on ***CMOS Layout Design*** in the TEQIP-III Sponsored five day workshop on **CMOS Digital IC Design : Concepts and Recent Trends** held from *March 26-30 March, 2018* in the College of Technology and Enginnering (CTAE), MPUAT at Udaipur.
24. A talk on ***Wide-BandGap Materials*** in the TEQIP-II Sponsored One Week Short Term Training Program (STTP) on **VLSI-SoC & Micro-nano Technologies** held from *26 - 30 September, 2016*, in the Department of Electronics and Telecommunication Engineering at NIT, Raipur.

Workshop Organized

Organised Faculty Development Program entitled “Emerging trends in RF and Energy device and Circuits” as Convenor from 22-26 Feb 2021 sponsored by AICTE, funding received 93000.

Organised Workshop entitled “Signal Processing Techniques for Real-Time Applications” as Coordinator from March 23 â 27, 2018 sponsored by NIT Meghalaya.

Industrial Training & Workshop Attended

Participated in the **Online Short Term Course on Nanotechnology for Electronics and Photonic Devices (NanoDev 2010)**, organized by Electronics & Communication Engineering Department of Punjab Engineering College, Chandigarh, supported by TEQIP-III, during 15-19 June 2020

Instruction Enhancement Programme (IEP) under the project "Special Manpower Development Programme for Chips to System Design (SMDP-C2SD)" is scheduled to be held at VNIT Nagpur on *5- 9th December 2016*.

Mentor Graphics EDA Tool training under the project "Special Manpower Development Programme for Chips to System Design (SMDP-C2SD)" is scheduled to be held at SGSITS, Indore on *26th- 29th December 2016* .

National Workshop on **Timing Analysis of Digital VLSI Circuits** at IIIT Allahabad on *3-4 November, 2012*

Workshop on **Machine Learning and Social Networks** at IIT Kharagpur on *8 March, 2014*

Author Workshop jointly organized by Springer & IIT Kharagpur on *16 January 2015*

Workshop on **Scholarly Publishing** jointly organized by Wiley & IIT Kharagpur on *23 March 2015*

Organization : Grey Iron Foundry (G.I.F), Jabalpur (M.P) on *2008 (for 15 days)*
Key Learning : Learned about the use of the electronics in industry like Spectroscopy.

Organization : Broadcasting Corporation of India (Prasar Bharti / AIR) Jabalpur (M.P) on *2009 (for 15 days)*
Key Learning : Learned about transmitting of radio (FM) Signal and TV signal

Organization : Vehicle Factory Jabalpur (V.F.J) (M.P) on *2009 (for 15 days)*.
Key Learning : Learned about the use of the electronics in industry like CNC (Computer Numeric Code).

Outreach Activities

Session chair in the conference International Conference on Cognitive Computing and Cyber Physical Systems 5-7 April 2024

Evaluator in Smart India Hackathon 2022

Primary Evaluator in Toycathon 2021 (Digital Edition).

Reviewer and Session chair of various conferences and journals.

Organizing chair and website administrator of IESC 2019 conference

Served as **Warden** of Lapalang-1 boys hostel of National Institute of Technology, Meghalaya, from July 2018 to June 2021.

Served as **General Secretary** (Library) in Acharya Jagadish Chandra Bose Hall of Residence IIT Kharagpur from *July 2014 to July 2015*

Served as **Organizing Committee** in Research Scholar's Day of Advanced Technology Development Center, IIT Kharagpur on *July 2015*.

Reviewer

1. **International Projects :**
   - International Science Partnerships Fund (ISPF) Project – 10 Project Reviewed
2. **Sponsored Projects :**
   - SERB– High Risk High Reward (HRR) DST Project – 2 Project Reviewed
   - SERB– Core Research Grant (CRG) DST Project – 10 Project Reviewed
   - Global Initiative of Academic Networks (GIAN) proposal reviewed - 2 proposals
3. **Journal :**
   - IEEE Transaction on Instrumentation and Measurements
   - IEEE Transactions on Intelligent Transportation Systems
   - IEEE Sensors Journal
   - IEEE Sensors Letters
   - IEEE Transactions on Nanotechnology
   - IEEE Transactions on Electron Devices
   - IEEE Access
   - IET Electronics Letter
   - Journal of Computational Electronics
   - Superlattices and Microstructures
   - Microelectronics Journal
   - Vacuum
   - International Journal of Numerical Modelling: Electronic Networks, Devices and Fields
4. **Conference :**

- Special Session in iSES 2024
- Reviewer and Tutorial Speaker in MAPCON 2024 and Reviewer in MAPCON 2023, 2022
- Session Chair, Reviewer & TPC of VLSI DCS 2020
- Program Chair of VDAT 2019 & VDAT 2022
- Reviewer of UPCON 2019
- Reviewer & Website Administrator of IESC2019
- Member in Conference Committee in First International Conference on Microelectronic Devices and Technologies (MicDAT 2018), Universitat Politecnica de Catalunya (UPC), Barcelona, Spain.
- Technical Program Committee (TPC) member of Conference on Information and Communication Technology (CICT) 2018
- Technical Program Committee (TPC) member of Conference on Information and Communication Technology (CICT) 2017

Editorial Position

1. Review Editor of Frontiers in Integrated Circuits and VLSI.

Voluntary Service for IEEE

1. Faculty in-charge of IEEE MTTS Student Chapter. Conducted about 15 webinars under this Student Chapter. Received $1000 from MTTS for organizing the events.
2. Faculty in-charge of IEEE CASS student chapter/ IEEE Sensor council student chapter/ IEEE CEDA student chapter. Motivating students for taking the membership via organizing membership drive and working for Agrielectronics.
3. Faculty in-charge of IEEE WiE student chapter. Motivating female students to increase the visibility by opening WiE student chapter.
4. Reviewer of several transactions like TED, MTTS, TCAS-II, TNANO, TDMR, etc and letters like MWTL, EDL, etc.
5. TPC and Reviewer of several conferences like ISCAS, MAPCON, VLSID, VDAT, etc.